

ADVANCE INFORMATION

AD9731

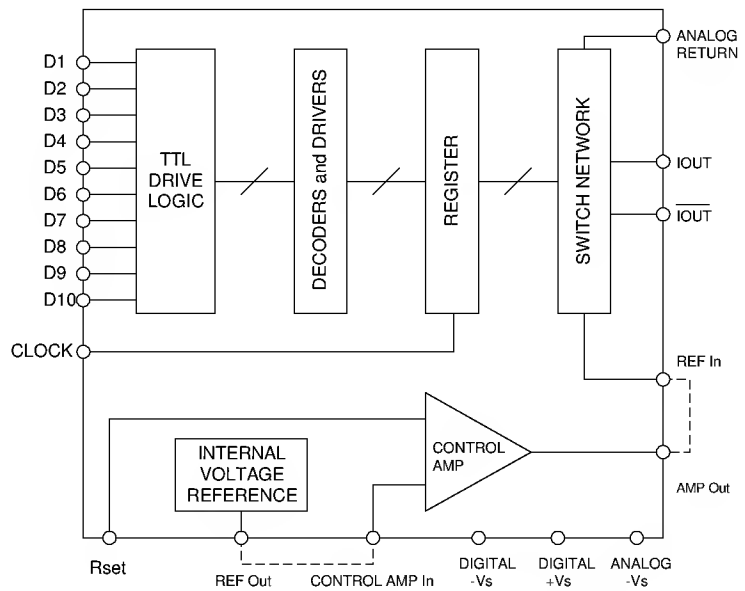
FEATURES

125 MSPS Update Rate
75 dB SFDR @ 2 MHz/68 dB@ 40 MHz
Pin-compatible, Lower-Cost Replacement for Industry Standard AD9721 DAC
Low Power: 375 mW@ 125 MSPS
Fast Settling: 4.5 nS to 1/2 LSB
Low Glitch Energy: 1.5 pVS
Internal Reference
Two Package Styles: 28-pin SOIC and SSOP

APPLICATIONS

Digital Communications
Direct Digital Synthesis
Waveform Reconstruction
High-speed Imaging

ADI Proprietary



AD9731 FUNCTIONAL BLOCK DIAGRAM

GENERAL DESCRIPTION

The AD9731 is a 10-bit, 125 Msps, bipolar D/A converter that is optimized to provide high dynamic performance, yet offer lower power dissipation, and more economical pricing than afforded by present bipolar high-performance DAC solutions. The AD9731 was designed primarily for demanding communications systems applications where wideband spurious-free dynamic range (SFDR) requirements are strenuous and could previously only be met by using a high-performance DAC, such as the industry-standard AD9721. The proliferation of digital communications into basestation and high-volume subscriber-end markets have created a demand for excellent DAC performance delivered at reduced levels of power dissipation and cost. The AD9731 answers that demand.

Optimized for direct digital synthesis (DDS) waveform reconstruction, the AD9731 provides up to 65 dB of wideband harmonic suppression over the DC to 42 MHz analog output bandwidth. This signal bandwidth addresses the transmit spectrum in many of the emerging digital communications applications where signal purity is critical. Narrowband, the AD9731 provides an SFDR of greater than 80 dB. This excellent wideband and narrowband AC performance, coupled with a lower pricing structure, make the AD9731 the optimum high-performance DAC value.

The AD9731 is packaged in 28-pin SOIC (same footprint as the industry standard AD9721) and super space-saving 28-pin SSOP; both are specified to operate over the extended industrial temperature range of -40° to +85° C.

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One Technology Way; P.O. Box 9106; Norwood, MA 02062-9106
Tel: 617/329-4700 TWX: 710/394-6577

West Coast
714/641-9391

Central
214/231-5094

Atlantic
215/643-7790

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ABSOLUTE MAXIMUM RATINGS¹

Analog Input.....	0 V to +Vs	Maximum Junction Temp.	+165° C
Vs	+6 V	Operating Temp.	-40° C to +85° C
Digital Inputs	-0.7 V to +Vs	Lead Temp. (10 sec. soldering)	+300° C
Analog Output Current	30 mA	Storage Temperature	-65° C to +150° C

AD9731 PRELIMINARY ELECTRICAL CHARACTERISTICS (+Vs=+5 V, -Vs=-5.2 V, ENCODE=125

Msps,

Rset= 1.95 k Ω for 20 mA Iout, unless otherwise noted).

Parameter	Temp	Test Level	AD9731			Units
			Min	Typ	Max	
RESOLUTION			10			Bits
DC ACCURACY						
Differential Nonlinearity	+25°C	I		.25		LSB
	Full	VI		.75		LSB
Integral Nonlinearity	+25°C	I		.5		LSB
	Full	VI		1.0		LSB
INITIAL OFFSET ERROR						
Zero-scale Offset Error	+25°C	I		20		uA
	Full	VI		20		uA
Gain Error	+25°C	I		10		%FS
	Full	VI		15		%FS
OUTPUT PERFORMANCE						
Full Scale Output Current	+25°C	V			20.48	mA
Output Compliance	+25°C	IV	0		+3	V
Output Resistance	+25°C	V		210		Ω
Output Capacitance	+25°C	V		6		pF
Output Update Rate	+25°C	IV	125			MHz
Voltage Settling Time	+25°C	V		4.5		ns
Propagation Delay	+25°C	V		4.5		ns
Glitch Impulse	+25°C	V		1.5		pVs
Output Rise Time	+25°C	V		675		ps
Output Fall Time	+25°C	V		470		ps
DIGITAL INPUTS						
Data Setup Time	+25°C	IV		2.5		ns
	Full	IV		3.0		ns
Data Hold Time	+25°C	IV		1.0		ns
	Full	IV		1.0		ns
Logic "1" Voltage	Full	VI	2.0			V
Logic "0" Voltage	Full	VI			0.8	V
Logic "1" Current	Full	VI			10	uA
Logic "0" Current	Full	VI			10	uA
DYNAMIC PERFORMANCE						
SFDR 2MHz	+25°C	V		75		dB
SFDR 10MHz	+25°C	V		72		dB
SFDR 20MHz	+25°C	V		70		dB
SFDR 40MHz	+25°C	V		68		dB
POWER SUPPLY						
+V Supply Current	+25°C	I		55		mA
	Full	VI		60		mA
Power Dissipation	+25°C	I		310		mW
	Full	VI		400		mW
PSRR	+25°C	V		100		uA/V

AD9731 Advance Data Sheet**ADI Proprietary****NOTES**

¹ Absolute maximum ratings are limiting values, to be applied individually, and beyond which the serviceability of the circuit may be impaired. Functional operability under any of these conditions is not necessarily implied. Exposure of absolute maximum rating conditions for extended periods of time may affect device reliability.

EXPLANATION OF TEST LEVELS**Test Level**

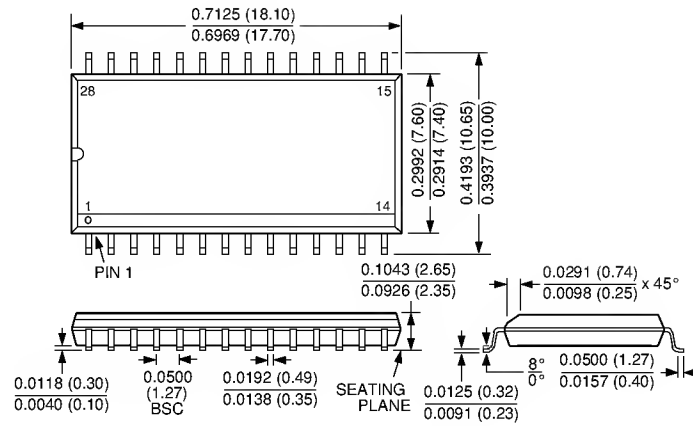
- I - 100% Production Tested.
- III - Sample Tested Only.
- IV - Parameter is guaranteed by design and characterization testing.
- V - Parameter is a typical value only.
- VI - All devices are 100% production tested at +25°C. 100% production tested at temperature extremes for military temperature devices; guaranteed by design and characterization testing for industrial devices.

D1(MSB)	1	28	GND
D2	2	27	Digital -Vs
D3	3	26	CONTROL AMP IN
D4	4	25	REF Out
D5	5	24	CONTROL AMP OUT
D6	6	23	REF IN
D7	7	22	Analog -Vs
D8	8	21	IOU_TB
D9	9	20	IOU_T
D10(LSB)	10	19	Analog GND
CLOCK	11	18	GND
N/C	12	17	Rset
N/C	13	16	Digital -Vs
+Vs	14	15	GND

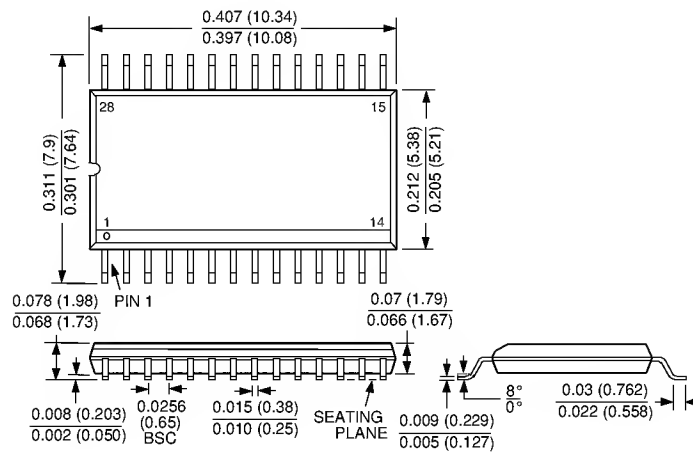
AD9731 Pin Assignments

AD9731 Advance Data Sheet

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28-Pin SOIC Package Outline



28-pin SSOP Package Outline